

Environmental Assessment
of the Strategic Energy Assessment 2016-2022
PSC Docket 5-ES-108

This is the environmental assessment (EA) of the draft 2016 Strategic Energy Assessment (SEA) that covers the period from January 1, 2016, through December 31, 2022.

This EA requires the Commission to discuss generic issues presented in the draft SEA and to describe potential environmental impacts. It is issued at least 30 days prior to the public hearing on the draft SEA, pursuant to Wis. Stat. § 196.491(2)(f). The EA can provide participating citizens some environmental perspective as they form their comments on the SEA for the hearing.

The SEA hearing is scheduled for Wednesday, May 11, 2016, at 1:00 p.m. in the Amnicon Falls Hearing Room on the first Floor of the Public Service Commission Building, 610 North Whitney Way, Madison, Wisconsin. Details about the hearing can be found in the Commission Notice of Hearing issued on April 4, 2016. ([PSC REF#: 284129.](#)) All documents in this docket are filed on the Commission's Electronic Regulatory Filing (ERF) system. To view these documents: (1) go to the Commission's web site at <http://psc.wi.gov>, (2) enter "5-ES-108" in the box labeled "Link Directly to a Case," and (3) select "GO."

Comments made during the public hearing period will be considered as Commission staff prepares the final SEA. In accordance with Wis. Stat. § 196.491(2)(e), the due date for receiving comments is 90 days after issuance of the draft SEA, which occurred on March 24, 2016. ([PSC REF#: 283591.](#)) The final SEA will be made available no later than 90 days after the hearing, pursuant to Wis. Stat. § 196.491(2)(gm).

Introduction

In accordance with Wis. Stat. § 196.491(2)(a), the SEA evaluates the adequacy and reliability of the state's current and future electrical supply. The SEA is an informational report for the public and electric industry stakeholders that describes relevant trends, facts, and issues affecting Wisconsin's electricity systems. As noted in Wis. Stat. § 196.491(3)(dm), the SEA is not a prescriptive report.¹ The ideas, facts, project possibilities, and policy discussions in the SEA will not be used as the exclusive basis for Commission decisions.

The purpose of the EA on the SEA is to discuss generic issues presented in the SEA and describe potential environmental impacts."² Because the SEA is not a prescriptive document, no

¹ Wisconsin Stat. § 196.491(3)(dm) states that, in making a determination for a Certificate of Public Convenience and Necessity (CPCN) for a construction authorization, the Commission may not consider a factual conclusion contained in the SEA unless the conclusion is independently corroborated in the CPCN hearing under a construction docket.

² Wisconsin Stat. § 196.491(2)(f) states that the EA on the SEA is not to be a detailed statement substantially following the guidelines issued by the U.S. Council on Environmental Quality. In that sense, it is not a traditional EA under the Wisconsin Environmental Policy Act (WEPA) as described in Wis. Admin. Code § 4.20(2).

Commission action is expected on the SEA other than the approval of the final SEA. That action will have no direct environmental effect.

This EA is organized around the items listed in the description of the scope of what the SEA 2016-2022 is intended to assess, identify, and describe. Those items are listed in the section following this introduction. The main sections of this EA address:

- SEA 2016-2022 electricity issues;
- Electricity supply in Wisconsin;
- Electricity demand in Wisconsin;
- Electricity transmission for Wisconsin;
- Wisconsin electricity rates;
- Distributed energy resources (DER) in Wisconsin;
- Energy efficiency;
- Renewable resources.

SEA 2016-2022 Issues and Required Assessments

Wisconsin Stat. § 196.491(2) states that the SEA must evaluate “the adequacy and reliability of the state’s current and future electrical supply.” It then itemizes 11 required items that the SEA must address. Those items are represented by the following list that the draft SEA intends to assess, identify and describe:

- All large electric generating facilities for which an electricity provider or merchant plant developer plans to commence construction within seven years. This item relates to Wis. Stat. § 196.491(2)(a)3.).
- All high-voltage transmission lines for which an electricity provider plans to commence construction within seven years. This item relates to Wis. Stat. § 196.491(2)(a)3m.
- Any plans for assuring that there is an adequate ability to transfer electric power into or out of Wisconsin in a reliable manner. This item relates to Wis. Stat. § 196.491(2)(a)3r.
- The projected demand for electric energy and the basis for determining the projected demand. This item relates to Wis. Stat. § 196.491(2)(a)4.
- Activities to discourage inefficient and excessive energy use. This relates to § 196.491(2)(a)7.
- Existing and planned generation facilities that use renewable energy resources. This item relates to Wis. Stat. § 196.491(2)(a)9.
- Regional and national policy initiatives that could have direct and material impacts on Wisconsin’s energy supply, delivery, and rates. This item does not clearly relate to any required assessment in Wis. Stat. § 196.491(2)(a).
- The adequacy and reliability of purchased generation capacity and energy to serve the needs of the public. This item relates to Wis. Stat. § 196.491(2)(a)3g.

- The extent to which the regional bulk-power market is contributing to the adequacy and reliability of the state’s electrical supply. This item relates to Wis. Stat. § 196.491(2)(a)11.
- The extent to which effective competition is contributing to a reliable, low-cost, and environmentally sound source of electricity for the public. This item relates to Wis. Stat. § 196.491(2)(a)12.
- Whether sufficient electric capacity and energy will be available to the public at a reasonable price. This item relates to Wis. Stat. § 196.491(2)(a)13.

One item from Wis. Stat. § 196.491(2)(a) does not directly correspond to any of the above items. That item is listed as Wis. Stat. § 196.491(2)(a)10., “Consider the public interest in economic development, public health and safety, protection of the environment and diversification of sources of energy supplies.”

This environmental assessment can serve part of that purpose in its consideration of public health and safety and protection of the environment.

Electricity Supply and Demand

Demand for Electricity

Utilities’ Perspectives

To be able to meet demand reliably, electric providers must be able to meet demand during peak load. Demand, as described in the draft SEA, fluctuates throughout the day and throughout the year. Wisconsin providers have demonstrated sufficient resources to meet summer and winter peaks in recent years. Providers reported that they expect similar demand growth from 2016-2022 to what was forecast in the 2014 SEA, and that they have adequate resources to meet this demand through 2022.

However, looking at the forecasted aggregated peak electric demand from 2016 to 2022 and seeing that the planning reserve margin remains at a comfortable level, the draft SEA also states that “the independent needs of some electricity providers may result in a need for new generation resources to be placed in service before 2022.” Thus, certain utilities have forecasted needs for increased generation, in order to meet that demand as discussed later in this document.

Programs to Control Peak Demand

The draft SEA states that summer peak demand, while variable, has not increased over the last 10 years. Winter peak demand in general is shown to be about 80 to 90 percent of the summer peak demand levels. Both types of peaks have been addressed in the past by providers using peak load management methods, including direct load control for residential customers or interruptible load tariffs for businesses. Participants in those programs receive credits or lower rates.

Table 5 of the draft SEA illustrates amounts of total electric load, or use, available through direct load control and interruptible load programs since 2003 and forecasted to 2022. The draft SEA indicates in related text that actual direct load reductions have historically been about half of what was available. This statement highlights the reliability of the electric supply system and the

voluntary participation of residential households in the potential opportunity to save money by sacrificing to save electricity for others.

Supply of Electricity

Bulk Power Market

According to the draft SEA, Wisconsin energy providers have adequate electricity generating capacity to meet the Commission-set guideline of 14.5 percent for a reserve planning margin. The reserve planning margin is expressed as a percent of capacity greater than forecasted demand for electricity and is maintained to increase the probability that state utilities can serve all their customers during peak demand conditions. The Commission, as stated in the draft SEA, expects the reserve planning margin to stay above 14 percent through 2022.

The regional interstate electricity planning body, called the Midcontinent Independent Service Operator, Inc. (MISO), also requires maintenance of a reserve planning margin. MISO's required margin is less than that expected in Wisconsin, at 7.1 percent, and Wisconsin electricity providers, all part of MISO, are expected to exceed it through 2022 as well.

In conclusion, Wisconsin will have adequate electricity to satisfy demand between 2016 and 2022.

Cost

Competition's effects on cost

The draft SEA shows that MISO's wholesale energy markets have been competitive with little need to apply "market power mitigation measures." They are also expected to continue to be competitive. The competition compels the providers to provide electricity at a reasonable price.

In addition to the effects of competition, the Commission can exert some control on price. Because the Commission: (1) reviews all purchase power contracts for prudence, (2) verifies that costs associated with new generation projects pass an appropriate cost-effectiveness threshold, and (3) ensures that electricity providers comply with the Renewable Portfolio Standard in a cost-effective manner, the draft SEA also concludes that capacity and energy will continue to be available at a reasonable price.

Costs of environmental protections, accepted or externalized

The draft SEA identifies the additional costs incurred as a result of environmental regulations, such as air pollution control measures and monetization of environmental externalities. These cost impacts are further discussed in the sections of this document and the draft SEA on rates. Environmental rules that influence electricity costs include protections under the federal Clean Water Act and Clean Air Act specifically related to the 316b water intake structure rules, the National Ambient Air Quality Standards, the Cross-State Air Pollution rules, the Mercury and Air Toxic Standards, Coal Combustion Residuals Rule, and state rules like the Wisconsin Effluent Standards and Limitations for Phosphorus and the Wisconsin Pollution Discharge Elimination System. The federal Clean Power Plan, which establishes carbon limits for new and existing power plants is currently stayed, pending litigation. As a result, the costs and potential impacts of this rule are unknown and information premature and unavailable.

The draft SEA indicates that, whenever externalities are newly recognized by public policy and not already considered least-cost options by the generators, the resulting market clearing prices are higher. It also notes that the higher prices resulting from new or proposed environmental regulations would likely not be reduced by effective wholesale market competition since compliance costs would be incurred by all MISO market participants who are obligated to comply with rules set by the U.S. Environmental Protection Agency (EPA).

Emission control projects

There are currently four major Commission-approved emissions control projects under construction in Wisconsin, listed in the draft SEA's Table 6. Each has been subject to the Commission's environmental review that is part of the Certificate of Authority (CA) approval process. Flue gas desulfurization systems to reduce sulfur emissions into the air are being installed at the Edgewater 5 unit in Sheboygan and the Weston 3 unit in Rothschild. Selective catalytic reduction systems to convert nitrogen oxides into other substances are being installed at Columbia 2 near Poynette and John P. Madgett by Alma. Other similar projects have been approved and completed before 2016 and need not be addressed in the current SEA. The current draft SEA also notes smaller projects such as combustion control projects to reduce nitrogen oxide emissions and activated carbon projects to control mercury emissions. These projects' costs were low enough that they did not trigger the need for a Certificate of Authority from the Commission, but the draft SEA notes that they add to the costs of plant operation and maintenance.

They also, however, provide needed controls of air emissions and protect the public from otherwise externalized pollution impacts from those plants.

New generation expected

According to the draft SEA, there are planned electric capacity additions and retirements that are expected to occur between 2016 and 2022. The combination of the closure of the Kewaunee Nuclear Power Plant and retirement of several smaller and older coal-fired plants have led the electricity providers to estimate needs for a total of between 200 and 700 megawatts (MW) of additional capacity.

New electricity provider-owned or leased generation capacity additions are listed in the SEA's Table A-1. They include three natural gas-fired plants and one hydroelectric plant. The overall effect in terms of air impacts would be a reduction in pollutants since the expected plants are either hydropower or natural gas-fired instead of coal-fired.

The new generation includes two upgrade projects, a 9 MW increase at a hydro plant near Twin Falls and a 60 MW increase at the natural gas-fired plant in Port Washington. The hydro project is within the existing dam and turbine house location, and the natural gas project is an upgrade that will make the Port Washington plant more efficient. Each of these projects would likely require a CA from the Commission, and an attendant environmental review under the Wisconsin Environmental Policy Act (WEPA).

The two other plants listed in Table A-1 are the recently-approved 700 MW Wisconsin Power and Light Company (WP&L) Riverside Energy Center Expansion project near Beloit and Janesville, an efficient natural gas-fired combined-cycle plant with few additional environmental or health impacts expected, and a not-yet-known natural gas-fired peaking or intermittent

combined-cycle plant being considered by Dairyland Power Cooperative (DPC). The Riverside project has recently received a Certificate of Public Convenience and Necessity (CPCN) from the Commission. The CPCN review included preparation of an environmental assessment under WEPA and a hearing. The DPC project will be addressed by the Commission only if it has a nameplate capacity of at least 100 MW. It will likely be subject to environmental review, though, in order to receive funding from the U.S. Rural Utilities Service.

Xcel Energy (Xcel) plans the addition of about 700 MW of hydroelectric, wind, solar, and natural gas-fired power plus additional plant upgrades. All of these projects are to be located outside the state of Wisconsin, and their potential environmental impacts will be considered elsewhere.

Planned retirements

Wisconsin electricity providers can decide to save or “mothball” certain generation facilities for later use, “retrofit” them to make them more efficient or able to utilize a different cleaner or more accessible fuel, or retire them permanently from service. To do so requires them to evaluate impacts on reliability of their electricity supply in Wisconsin and in the larger MISO footprint. MISO decisions can affect Wisconsin decisions.

There are no major mothball or retrofit projects expected during the 2016-2022 timeframe.

Table A-3 of the draft SEA lists power plant retirements expected between 2016 and 2022. These include four natural gas-fired plants and one coal-fired plant. All except the coal-fired plant, the Edgewater 4 baseload plant in Sheboygan County along Lake Michigan, are natural gas-fired peaking plants. One of the peaking plants is near Park Falls, Wisconsin, in Price County, and the other three are in southern Wisconsin. The peaking plants range from six to 52 MW, totaling about 190 MW, while the coal-fired baseload plant along Lake Michigan has about 320 MW of capacity in and of itself.

The retirements come after evaluation by the providers as to whether they continue to be economic or whether they continue to be worth the costs of the necessary additional environmental protection measures.

Peaking plants provide a measure of reliability during periods of peak demand, but there are enough peaking plants in the state to provide this service. The plants expected to be retired are all older plants that are not as capable. The peakers’ retirements would release some natural gas to be used elsewhere, but the newly-approved Riverside Energy Center Expansion natural gas-fired combined-cycle plant would itself use this much natural gas and more.

The retirement of Edgewater 4 will remove about 320 MW of coal-fired capacity from the state’s fleet, along with the water and air impacts that it created. Part-owner WP&L is replacing that capacity with capacity from its new, cleaner and more efficient Riverside natural gas-fired combined-cycle plant.

Transmission of Electricity

The increased system and regulatory complexity, decreased certainty, increasing costs, and reduced opportunity for public involvement articulated in previous EAs for SEAs (2010-2014) are still relevant today, as we move into the period covered by the 2014-2020 SEA.

Regional Planning

The needs of Wisconsin, related to coordination and transmission planning, have been increasingly a part of a larger, growing, wholesale energy supply-and-demand response organization. As discussed in previous EAs of SEAs (2010-2014), Wisconsin's membership in MISO plays a very large part in the planning and determination of need for new transmission in Wisconsin, especially transmission lines greater than 100 kilovolts (kV). MISO's footprint includes 15 states and the Canadian Province of Manitoba (Figure 10 of the draft SEA). MISO, as the North American Electric Reliability Corporation's (NERC) Reliability Coordinator, makes decisions about generation dispatch and transmission needs within its footprint. As a FERC-designated Regional Transmission Organization (RTO), MISO also has functional responsibilities and control of the region's bulk electric system (transmission lines >100 kV), including both transmission planning and generation dispatch.

Another organization that has direct impact on transmission planning in Wisconsin is the Organization of MISO States (OMS). OMS coordinates regulatory oversight among states and has jurisdiction over entities that participate and are engaged in planning efforts in MISO. Its work is reflected in projects being considered in Wisconsin.

The 2016 draft SEA discusses transmission expansion planning efforts that continue to have an impact on Wisconsin and thus warrant Commission involvement. These efforts are organized around MISO's transmission expansion planning (MTEP) processes. The most recent is MTEP15.³ MISO planning principles relate to electricity access, reliability, cost lowering and sharing, and support of government energy objectives. The planning process is conducted at many different levels and MISO uses MTEP to determine if a Wisconsin transmission project, for instance, will work with its system and whether the project's costs should be shared beyond the state's boundaries. The Commission then considers how the shared costs affect the costs for the project's construction in Wisconsin.

The MTEP process considers projects in four categories including: (1) Baseline Reliability Projects (BRP), (2) Generator Interconnection Projects (GIP), (3) Market Efficiency Projects (MEP), and (4) Other Projects which include a wide range of maintenance and lower-voltage projects. Multi-Value Projects (MVP) are a special category of MTEP projects that meet reliability, market efficiency, and public policy objectives. Seventeen MVP projects have been approved within the MISO footprint and, because they are designated as MVPs, Wisconsin ratepayers are partially responsible for their costs. The MVP designation has been applied by MISO to three recently approved or planned electric transmission projects located, at least partially, in Wisconsin:

- Madison to La Crosse, Wisconsin (approved Badger Coulee Project, PSC Docket 5-CE-142),
- Madison to Dubuque, Iowa (planned project, identified below), and
- Pleasant Prairie to Zion, Illinois (planned project, identified below).

³ Each MTEP cycle lasts 18 months.

Of the projects identified in the 10-year MTEP planning horizon, approximately 227 miles of transmission facilities will be upgraded and 24 miles of transmission facilities will be newly constructed in Wisconsin. Not all of these projects will require Commission approval.

One special social and environmental impact of the MTEP process demanded attention during the previous SEAs, and continues to surface in recent transmission project reviews. Since Wisconsin's needs are now viewed as part of a much larger geographic region, they are often discussed on a regional scale instead of a local scale. Residents and landowners within a transmission project area are often concerned about bearing the burden of a new line so that others far away can use the electricity. Transmission lines create many known impacts in a variety of landscapes, but this concern pitting landowners and property owner rights against the MISO-determined public good has been accentuated in recent Wisconsin MVP transmission projects. This increased sense of unfairness among landowners will continue when the planning decisions and the determined need for the line increasingly appear to come not from local decision-makers or even from the Commission, but elsewhere beyond the state.

Interregional Planning

Federal Energy Regulatory Commission (FERC) Order 1000 requires interregional coordination with neighboring regions. The purpose of interregional planning is to work together to identify and evaluate possible projects that could help both regions with cost-effective measures to address market issues, reliability or other expansion plans. This appears to continue the focus of utilities towards region-wide planning instead of local (state-level) planning. The major interregional planning entities are illustrated in Figure 13 of the draft SEA. MISO proposed to FERC (and FERC approved) to end the cost-sharing for BRPs so that local transmission utilities have the sole right to build BRPs instead of having them go out for bid. This appears to reestablish the public comment opportunities at the local transmission utility and in the Commission's processes.

MISO continues to work with the Pennsylvania, New Jersey, Maryland (PJM) regional transmission organization, Southwest Power Pool (SPP), and the Electric Reliability Council of Texas (ERCOT) on interregional projects that address market reliability, pricing issues, transfer capabilities, system diversity, and evaluate market seam issues (where service territory of MISO is electrically interconnected with other grid operators). Currently, none of these projects cross into Wisconsin.

Not only are transmission projects being planned at scales beyond the state, but this planning is becoming increasingly complex and reliant on smart technology affecting a much wider land and population base. These variables give rise to security concerns.

Planned Construction and Commission Actions

In addition to approving new transmission construction, the Commission approves the rebuilding or upgrading of existing lines. Although some utility transmission expenditures in Wisconsin require a CA from the Commission, most transmission lines over 100 kV require a CPCN and Commission-sponsored public hearings. Transmission construction applications in Wisconsin

must meet detailed Commission filing requirements to provide the information that Commission and DNR staff need to evaluate and verify potential environmental and economic impacts of the projects' construction and operation.⁴

There are three utilities that are responsible for providing transmission service in Wisconsin, they include American Transmission Company LLC (ATC), DPC, and Xcel which does utility business as Northern States Power Company-Wisconsin (NSPW). All the potential projects discussed in the draft SEA have yet to be evaluated by Commission staff. A Commission review of any transmission application will examine the need for the project (and acknowledge MISO's analyses and approvals), its effects on the existing transmission system, its potential environmental and social impacts, and its cost to Wisconsin ratepayers.

A list of the proposed major high-voltage (>100 kV) electric transmission construction projects (subject to approval by the Commission) on which construction is expected to start between 2016-2022 are identified in Table A-2 and are depicted in Figure 9 of the draft SEA. This list includes several projects that will require Commission approval. This list does not include projects that have already been approved by the Commission and have already gone through the appropriate environmental review under WEPA, such as the Badger Coulee⁵ or North Appleton-Morgan⁶ projects, even though construction on these projects might not be complete. The reasons cited for construction of new high-voltage transmission lines are varied, and are described on pg. 21 of the draft SEA.

The following planned projects⁷ are either: (1) applications expected during the current SEA period; or (2) no certificate may be needed, but construction might begin during this period. They include:

- A new 109-mile 345 kV ATC line between the Cardinal and Hickory Creek Substations;
- A new 2.8-mile 345 kV ATC line between the Pleasant Prairie and Zion Substations;
- A new 8.6-mile 161 kV DPC line between the La Crosse and Briggs Road Substations;
- A new 40-mile 115 kV NSPW line between the Bayfront and Norrie Substations.
- A new 0.6-mile double-circuit 345/115 kV NSPW line between the Holcombe and Sheldon Substations;
- A 63-mile 345 kV NSPW line upgrade between the King and Eau Claire Substations;
- An 80-mile 345 kV NSPW line upgrade between the Eau Claire and Arpin Substations;

⁴ Transmission application filing requirements can be accessed at <http://psc.wi.gov/utilityinfo/electric/construction/transmissionlinerequirements.htm>.

⁵ Docket 5-CE-142

⁶ Docket 137-CE-166

⁷ They can also be found in Table A-2 of the Appendix of the draft SEA.

- A 45-mile 161 kV NSPW line upgrade between the Eau Claire and Tremval Substations;
- An 11-mile 161 kV NSPW line upgrade between the Briggs Road and La Crosse Substations.

These projects vary in the level of environmental review required. The DPC project is not likely to require Commission certification because it is either very short or entirely within existing right-of-way (ROW).

Impacts Associated with Electric Transmission Lines

Environmental, landowner, and community impacts can occur when transmission lines are either rebuilt,⁸ upgraded,⁹ or entirely new construction projects. In terms of impact, each type of construction can have varying effects on local landscapes. Both rebuilding and upgrading existing transmission lines may require newer, taller structures as well as new ROW. These modifications increase the impact of the existing facilities on the local landscape. In some cases, when existing lines are rebuilt they are relocated to reduce environmental impacts.

Potential Mitigation of Impacts Associated with Electric Transmission Lines

It may be possible to lessen or mitigate potential environmental, landowner, and community impacts by adjusting the proposed route, choosing a different type of pole structure, using different construction methods, or implementing any number of post-construction and/or best management practices. The Commission can require the project applicants to incorporate specific mitigation methods into the project design, construction process, and/or maintenance procedures. It is the policy of the state (Wis. Stat. § 1.12(6)) to site new transmission lines, to the greatest extent feasible that is consistent with economic and engineering considerations, reliability of electric system, and protection of the existing environment, utilizing corridors in the following order of priority: (a) existing utility corridors, (b) highway and railroad corridors, (c) recreational trails with limitations, and (d) new corridors.

Rates

The draft SEA states that the complexities of energy regulation and the energy market in the Midwest and the U.S. in general has resulted in rates that vary widely based on factors like whether there is an ongoing generation or transmission construction cycle or how the state and electricity providers handle the accounting behind the rate setting process.

Costs of new generation and transmission construction

The draft SEA notes that the costs of the recent two-decade construction cycle in Wisconsin are now being recovered in rates. Figure 14 shows utility rates in dollars per kilowatt-hour on the

⁸ To rebuild a line means to modify or replace an existing line; in other words, to keep it at the same voltage and improve its capacity to carry power through new hardware or design.

⁹ To upgrade a line means to modify or replace an existing line, but at a higher-voltage or current carrying capability. An upgrade also improves the line's capacity to carry power.

rise since 2002 not only for Wisconsin but for the Midwest overall and the U.S. The SEA also notes that the Commission evaluates and promotes the potential for selling excess energy from the newly built capacity into the MISO market so that the revenue is returned to utility retail customers in the Commission's rate-setting process. The return of revenue can represent a decrease in retail rates that can leave more money in customers' hands.

Comparison of Rates by Customer Class

Rates trends illustrated in the draft SEA in Tables 8 through 11 show that rates in the U.S., the Midwest, and Wisconsin for the residential, commercial, and industrial customer classes increased between 2005 and 2015. Each customer class in Wisconsin has seen its rates increase to a higher level in 2015 than any other state in the Upper Midwest.¹⁰ It is noted that the significant drivers of recent rate increases have been fuel prices, increased prices for purchased wholesale power, costs of generation and transmission construction, and lost sales resulting from the recent economic recession.

Rate increases have continued, then, to add to other increases in the costs of living and doing business that have made things more economically difficult for some ratepayers. The draft SEA notes that customers' increases can be reduced to some extent with energy conservation and efficiency. For example, energy efficiency and conservation programs such as the statewide Focus on Energy program have helped keep average Wisconsin residential usage flat over the last two decades.

On the other hand, the draft SEA also shows, in Table 12 and Figure 15, that Wisconsin's average residential monthly electricity bill between 2005 and 2015 was consistently among the lower bills in the Midwest, most often lower than the Midwest average and always lower than the U.S. average. Lower bills may be partly due to less electricity used as customers have tried to conserve in the face of higher rates.

The draft SEA implies that lower bills despite higher rates are at least in part a result of recent innovative retail business rate options that have been approved by the Commission that provide opportunities for businesses to control their energy costs while contributing to economic growth. It also repeats that sales of surplus energy to out-of-state utilities has the potential to help lower rates in Wisconsin. Improvement of the business climate would be expected to improve the economic climate for those using or employed by those businesses, which can improve not only the businesses' ability to contribute to economic growth but possibly improve residential customers' ability to improve their quality of life.

Finally, the draft SEA describes an example of utility-financed, customer-subscribed community solar energy programs in the Xcel service territory in Wisconsin. Programs like that example can provide some rate relief for subscribing customers while also reducing emissions from fossil fuel-generated electricity that otherwise might be utilized. It provides an additional avenue to distributed energy utilization and generation in Wisconsin from renewable resources, both to be discussed later in this document.

¹⁰ The Upper Midwest states include Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

Distributed Energy Resources

For the first time the Commission surveyed all municipal and investor owned electricity providers regarding the installations, capacity, and sales of distributed energy resources (DER)¹¹ in Wisconsin. The data from this survey can be found in Figures 16-23 and Tables A-4 through A-6 in the draft SEA.

In the residential sector, common DER systems can include:¹²

- solar photovoltaic panels,
- small wind turbines,
- natural gas-fired fuel cells, and
- emergency backup generators, usually fueled by gasoline or diesel fuel.

In the commercial and industrial sectors, DER systems can include:¹³

- combined heat and power systems,
- solar photovoltaic panels,
- wind
- hydropower,
- biomass combustion or co-firing,
- municipal solid waste incineration,
- fuel cells fired by natural gas or biomass, and
- reciprocating combustion engines, including backup generators, which may be fueled by oil.

DER systems typically use renewable energy sources.¹⁴ The net effect of DER on the grid will depend on its type, capability, and application. DER can significantly alter traditional load shapes by either increasing or reducing peaks, and potentially adding more variability in the load shape¹⁵ across hours.

Energy Efficiency

The draft SEA discusses energy efficiency largely in terms of costs and benefits of the Focus on Energy program, and it reaches a positive conclusion about the program's usefulness: the program is succeeding in saving energy and electricity costs for customers. Beyond Focus on Energy, additional energy services are provided. Some involve educational and behavior-based

¹¹ Data collected spans the period between January 2008 and September 2015. All DER figures shown in the SEA, with the exception of Figure 17, do not include data from DPC, as it was unable to provide customer class information.

¹² As stated by the EPA at <https://www.epa.gov/energy/distributed-generation>

¹³ As stated by the EPA at <https://www.epa.gov/energy/distributed-generation>

¹⁴ Maryland Clean Energy Center, accessed at <http://mdcleanenergy.org/all-about-energy/advanced-technologies/distributed-generation-energy-storage>

¹⁵ The effect of DERs on load shapes vary significantly across DER technology (NYISO 2014).

activities that do not have quantifiable dollar savings. These other activities can result indirectly in implementation of practices that can produce quantifiable dollar savings for customers.

Energy efficiency measures are investments for the customers, and expenditures each year have been shown to result in energy savings that persist for multiple years depending on the types of measures adopted. Savings are often expressed at the Commission in dollars, but savings result in environmental resources as well.

Energy efficiency can translate into reductions in needed generation and its associated air pollution emissions, as well as reductions in the need for additional or upgraded electric transmission and other environmental impacts of electricity generation and delivery.

Generation from Renewable Resources

According to the draft SEA, the main driver of large-scale renewable resource development by Wisconsin electricity providers continues to be the Renewable Portfolio Standard (RPS) as it was during the time of the 2014-2020 SEA. The most current goal of the RPS is to achieve 10 percent of all electricity provided to Wisconsin retail customers to come from renewable resources by 2015. A projected goal of about 6.5 million megawatt-hours is expected to continue to the end of the SEA cycle.

The draft SEA cites the Commission staff's July 2015 RPS Compliance Memorandum (Memorandum) for 2014 ([PSC REF#: 271802](#)) to show that the goal of 10 percent was met in 2013 and 2014, with projections showing that it will continue to be met through 2020.

The draft SEA states that other reasons exist among the providers for increasing generation from renewable resources as opposed to nonrenewable fossil fuels. These include:

- Hedging against market and fuel prices;
- Responding to customer interest in community-based renewable facilities;
- Increasing resource diversification.

The additional reasons could push the percentage of generation from renewable resources beyond the 10 percent goal, as could additional energy intended for customer-driven green pricing programs or applicable RPS requirements that some providers must also meet in other states.

As shown in Figures 28 and 29 of the SEA, wind is the most popular of the renewable resources being utilized. Most wind facilities in the MISO footprint, as shown in Figure 30 of the SEA, are located in the states of Iowa, Minnesota, and North Dakota. If a significant amount of that power is to be brought to Wisconsin, transmission is needed bringing the discussion back to transmission construction over the 2014-2022 period and its associated impacts.

Summary

A detailed assessment of the potential environmental effects related to the draft SEA is difficult because of the high degree of complexity and uncertainty about how the generation and transmission system will change over the next seven years, the possible regulatory changes, and the resulting impacts that might be anticipated.

In addition, because the SEA is not a prescriptive report, there is no quantifiable plan regarding what the industry or the Commission will do. Thus, no quantifiable assessment of environmental or social impact can be ascertained.

According to the 2016-2022 draft SEA, environmental and social impacts can potentially result along the following paths:

1. EPA regulations continue to lower overall emissions of sulfur dioxide, nitrogen oxides, mercury, and other pollutants as larger generation facilities in the state install the appropriate pollution control equipment and older facilities are retired from service.
2. Older, inefficient, coal-fired power plants are about to be retired, decreasing not only emissions of criteria pollutants and hazardous air pollutants but also carbon dioxide and related greenhouse gases.
3. Remaining fossil fuel-fired generation will continue to emit carbon dioxide, thus continuing to increase the amount of greenhouse gases in the atmosphere along with the potential for global climate change.
4. Growth in the use of renewable resources and DER can offset some of the carbon dioxide emissions from fossil fuel-fired generation. Among the renewable resources, however, the new biomass-fired generation, while considered carbon-neutral, adds carbon dioxide to the atmosphere that will take time to be sequestered as new forests are reestablished and regenerate.
5. There will be substantial impacts to natural resources and communities from the construction of new, large, high-voltage electric transmission lines for the purpose of maintaining local and regional reliability and those built primarily for economic reasons. There will also be local construction impacts and air emissions from expected new power plant units that would burn natural gas and require new pipelines.
6. There will likely continue to be increases in customer rates in the state to pay for ongoing and planned generation projects and particularly large transmission projects, including transmission projects in other states designated as MVP projects by MISO. These increases could be offset by sales of energy to other states with less efficient generation that cannot meet the new emission requirements.
7. An improvement should continue in the cost/benefit ratio of dollars spent on energy efficiency per dollars of benefit reaped.
8. All construction applications that come before the Commission are subject to review under Wis. Stat. § 1.11 and PSC 4.